

DIESEL SERVICE TECHNOLOGY I

Diesel Services Technology I introduces students to diesel engine operating principles and theories as well as fuel systems and hands-on training related to modern diesel engines. The course covers inspection, troubleshooting, overhaul and engine replacement procedures. It includes classroom and laboratory experiences concerned with all phases of repair work on diesel engines used to power buses, ships, trucks, railroad trains, electrical generators, construction machinery, and similar equipment. Instruction and practice is provided in the diagnostics and repair of engines. Students will demonstrate performance of these tasks as defined by ASE/NATEF standards. Use of technical manuals, hand and power tools and of testing and diagnostic equipment are also studied in the course.

- DOE Code: 5620
- Recommended Grade Level: Grade 11-12
- Recommended Prerequisites: Intro to Transportation
- Credits: 2-3 credits per semester, maximum of 6 credits
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- This course is aligned with postsecondary courses for Dual Credit:
 - Vincennes University
 - DESL 130/L-Diesel Engine Systems and Lab

Dual Credit

This course provides the opportunity for dual credit for students who meet postsecondary requirements for earning dual credit and successfully complete the dual credit requirements of this course.

Application of Content and Multiple Hour Offerings

Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences. When a course is offered for multiple hours per semester, the amount of laboratory application or work-based learning needs to be increased proportionally.

Career and Technical Student Organizations (CTSOs)

Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in SkillsUSA, the CTSO for this area.

Content Standards

Domain – Workplace Competency

Core Standard 1 Students develop employability skills to be successful in placement of a post secondary institution and/or career related area.

Standards

DSTI-1.1 Allocate the appropriate resources for task completion

- DSTI-1.2 Demonstrate effective interpersonal skills
- DSTI-1.3 Develop leadership skills
- DSTI-1.4 Establish positive relationships with people from diverse backgrounds
- DSTI-1.5 Research, analyze, and use data for work assignments
- DSTI-1.6 Apply effective critical thinking, decision making, and problem-solving techniques
- DSTI-1.7 Select and use appropriate tools and technology
- DSTI-1.8 Implement quality assurance measures and safeguards
- DSTI-1.9 Read and interpret written materials
- DSTI-1.10 Apply written communication skills
- DSTI-1.11 Demonstrate effective listening and speaking skills
- DSTI-1.12 Perform appropriate mathematical calculations correctly
- DSTI-1.13 Exhibit a responsible work ethic
- DSTI-1.14 Demonstrate accepted standards for ethical behavior
- DSTI-1.15 Practice safe working procedures during each stage of diagnosis and repair
- DSTI-1.16 Organize, research, and implement a complete preventive maintenance and inspection (P.M.I.)

Domain – Career Development

Core Standard 2 Students construct personal goals to structure successful paths recognized by business and industry.

Standards

- DSTI-2.1 Establish a personal career goal and develop objectives for achieving the goal
- DSTI-2.2 Evaluate employment and career pathway opportunities related to established career interest(s)
- DSTI-2.3 Create a continuing education plan that identifies further education and training options
- DSTI-2.4 Prepare for exams leading to certifications recognized by business and industry
- DSTI-2.5 Develop skills needed to enter the workforce
- DSTI-2.6 Evaluate resources that keep workers current in the career field
- DSTI-2.7 Demonstrate skills and attitudes needed for lifelong learning
- DSTI-2.8 Apply effective money management strategies

Domain – Engines

Core Standard 3 Students analyze diesel engine operations to diagnose and repair malfunctions.

Standards

- DSTI-3.1 Analyze the fundamentals of a diesel engine
- DSTI-3.2 Perform engine assembly and disassembly procedures
- DSTI-3.3 Diagnose engine performance
- DSTI-3.4 Identify tools and equipment used in engine service
- DSTI-3.5 Adjust or measure valve and engine brake clearance
- DSTI-3.6 Utilize scan tools for engine service
- DSTI-3.7 Identify new emission controls and serviceability
- DSTI-3.8 Perform injector replacement procedures

DSTI-3.9 Diagnose drivability concerns

DSTI-3.10 Demonstrate proper shop safety practices while servicing engines

Systems

Core Standard 4 Students examine various system to diagnose and repair malfunctions.

DSTI-4.1 Diagnose and repair fuel systems

DSTI-4.2 Evaluate and repair electrical/electronic systems

DSTI-4.3 Diagnose and repair lubrication systems

DSTI-4.4 Analyze and repair heating/cooling system

DSTI-4.5 Assess and repair intake and exhaust systems

DSTI-4.6 Perform preventative maintenance to the fuel system and lubricating system

DSTI-4.7 Service the cold starting aid system

Fluids

Core Standard 5 Students evaluate fuel and other fluids used in diesel engines to perform appropriate maintenance and optimization procedures.

DSTI-5.1 Identify the type of fuel and lubricating oil required for a diesel engine

DSTI-5.2 Service the coolant and fuel heaters

Process Standards

Common Core Literacy Standards for Technical Subjects

Reading Standards for Literacy in Technical Subjects 11-12

The standards below begin at grade 11 and define what students should understand and be able to do by the end of grade 12. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations – the former providing broad standards, the latter providing additional specificity.

Key Ideas and Details

11-12.RT.1 Cite specific textual evidence to support analysis of technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

11-12.RT.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

11-12.RT.3 Follow precisely a complex multistep procedure when performing technical tasks; analyze the specific results based on explanations in the text.

Craft and Structure

11-12.RT.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific context relevant to *grades 11-12 texts and topics*.

11-12.RT.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

11-12.RT.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

Integration of Knowledge and Idea

- 11-12.RT.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- 11-12.RT.8 Evaluate the hypotheses, data, analysis, and conclusions in a technical subject, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
- 11-12.RT.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Range of Reading and Level of Text Complexity

- 11-12.RT.10 By the end of grade 12, read and comprehend technical texts in the grades 11-CCR text complexity band independently and proficiently.

Writing Standards for Literacy in Technical Subjects 11-12

The standards below begin at grade 11 and define what students should understand and be able to do by the end of grade 12. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations – the former providing broad standards, the latter providing additional specificity.

Text Types and Purposes

- 11-12.WT.1 Write arguments focused on *discipline-specific content*.
- 11-12.WT.2 Write informative/explanatory texts, including technical processes.
- 11-12.WT.3 Students will not write narratives in technical subjects. *Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In technical, students must be able to write precise enough descriptions of the step-by-step procedures they use in their technical work that others can replicate them and (possibly) reach the same results.*

Production and Distribution of Writing

- 11-12.WT.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- 11-12.WT.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
- 11-12.WT.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Research to Build and Present Knowledge

- 11-12.WT.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- 11-12.WT.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for

citation

11-12.WT.9 Draw evidence from informational texts to support analysis, reflection, and research.

Range of Writing

11-12.WT.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.